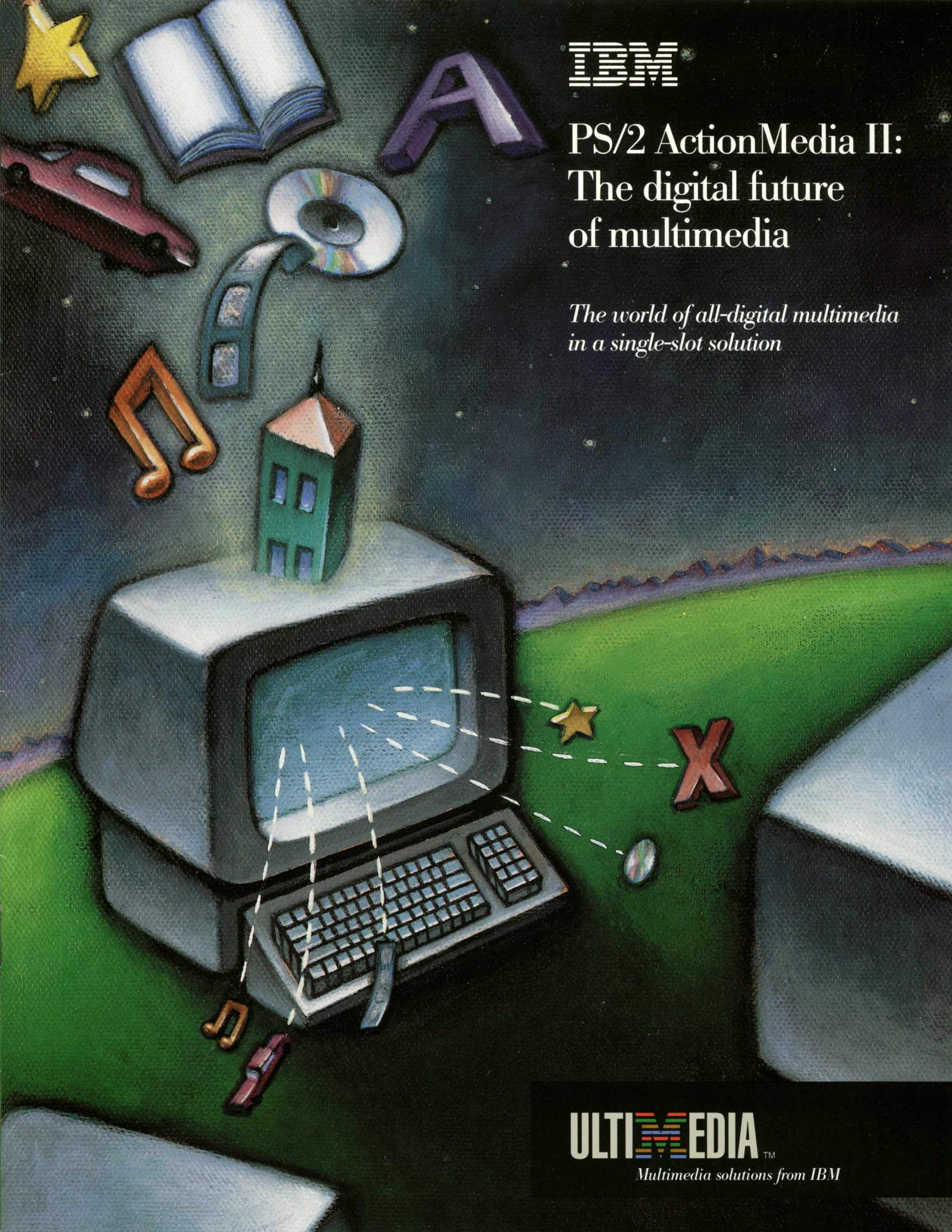


IBM

PS/2 ActionMedia II: The digital future of multimedia

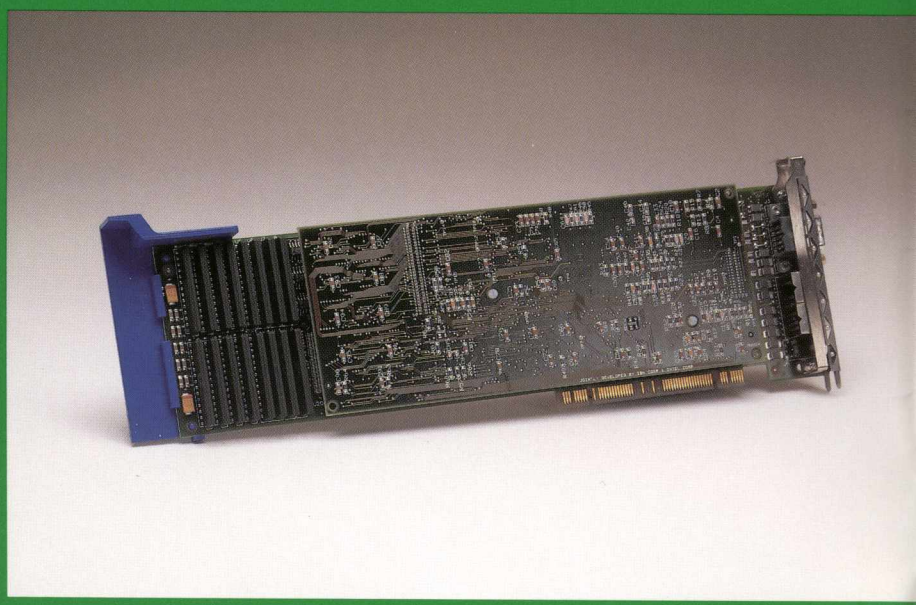
The world of all-digital multimedia in a single-slot solution

ULTIMEDIA™

Multimedia solutions from IBM

ULTIMEDIA™

Ultimedia designates IBM's family of multimedia products and services which deliver the ultimate in multimedia solutions and support. Ultimedia goes beyond text and graphics to include high-quality images, animation, thrilling full-motion video, brilliant stereo sound, and touch-based interaction.



IBM PS/2 ActionMedia II: The digital future of multimedia

The digital future of multimedia is here. IBM introduces the IBM PS/2® ActionMedia™ II adapters – all-in-one, single-slot multimedia solutions that transform existing IBM PS/2s into stunning "information theaters."

Based on breakthrough Digital Video Interactive (DVI®) technology, IBM PS/2 ActionMedia II is today's superior solution for augmenting PS/2s with multimedia capability. ActionMedia II provides a unified, all-digital multimedia environment allowing both display and capture of high-quality motion video, audio and still images in a single-slot implementation.

ActionMedia II applications can be created to meet a myriad of communications needs, including training, just-in-time guidance, education, merchandising, point-of-information kiosks, business presentations and videoconferencing.

In the past, analog-based multimedia required expensive videodisk pressing, plus standalone videodisk players at every PS/2. Now with the all-digital technology of IBM PS/2 ActionMedia II, multimedia applications can be created in real time, without videodisk production. Once created, all-digital ActionMedia II applications can be integrated into the existing computing infrastructure and networked across entire organizations.

IBM PS/2 ActionMedia II benefits

- Integrates diverse media in a single platform – adding stereo audio, high-quality images, animation and full-motion video to the PS/2's existing text and graphics capabilities.
- Employs all-digital technology, allowing easier creation and editing of multimedia content, and the networking of such content across entire organizations.
- Allows affordable media storage and distribution, using low-cost CD-ROM, rewritable optical disks, hard drives, diskettes and digital networks.
- Enables a single-slot multimedia solution – for both Micro Channel® and ISA-bus IBM PS/2s.
- Support for OS/2® and future support for the DOS/Windows™ environment.

ActionMedia II: technical overview

The IBM PS/2 ActionMedia II display adapter can be deployed on most Micro Channel 386 and 486-based PS/2s and on the AT-bus PS/2 Models 35SX and 40SX. The products themselves consist of a single-slot playback adapter and an optional snap-on "daughter card" for realtime capture of multimedia content. For Micro Channel PS/2s, the models are:

- IBM PS/2 ActionMedia II Display Adapter/A 2MB
- IBM PS/2 ActionMedia II Capture Option.

For the IBM ISA-bus PS/2 Models 35SX and 40SX, the models are:

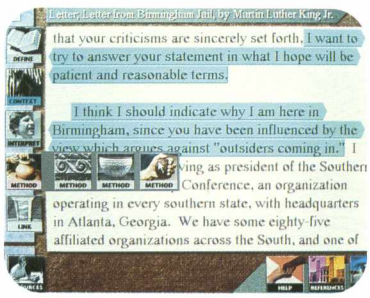
- IBM PS/2 ActionMedia II Display Adapter 2MB
- IBM PS/2 ActionMedia II Capture Option.

(The capture daughter card is identical for each implementation.)

The IBM PS/2 ActionMedia II Display Adapters can provide up to 30-frames-per-second motion video, high-quality audio and high-quality images from a variety of sources – local PS/2 digital storage devices, attached digital networks, or analog video (from VCRs, videodisk players, broadcast TV, etc.) digitized in real time by the Capture Option. Multimedia content may be combined on-screen with text and graphics generated on the host PS/2; this capability enables multimedia to augment everyday computer applications, if the applications are extended to support ActionMedia II.

Before digital multimedia data streams can be managed over a network or stored on disk, they must first be compressed. The IBM PS/2 ActionMedia II platform employs a revolutionary digital compression and decompression technology called Digital Video Interactive (DVI), developed by IBM and Intel Corporation. Using DVI Technology Real Time Video (RTV) capability, the Capture Option has the ability to capture and digitize still images or full-motion video in real time for storage on the local PS/2 or transmission over a local-area network. While RTV compression provides adequate display quality for many applications, applications requiring higher quality video may be produced through Production Level Video (PLV) compression, which is performed offsite by Intel-licensed vendors. PLV compression enables video quality equal to or better than VCR videotape.

Introduction to multimedia


Letter, Letter from Birmingham Jail, by Martin Luther King, Jr.
that your criticisms are sincerely set forth, I want to try to answer your statement in what I hope will be patient and reasonable terms.
I think I should indicate why I am here in Birmingham, since you have been influenced by the view which argues against "outsiders coming in." I
ving, as president of the Southern
Conference, an organization operating in every southern state, with headquarters in Atlanta, Georgia. We have some eighty-five affiliated organizations across the South, and one of
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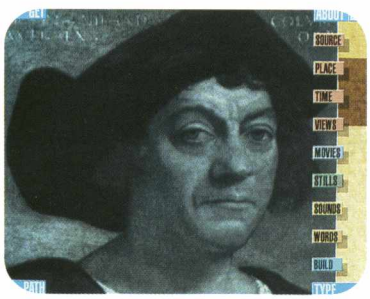


Multimedia expands the "bandwidth" of communication between people and computers by enabling information to be expressed in an intuitive manner. With multimedia, computers can go beyond text and graphics to include high-quality still imagery, animation, full-motion video, stereo sound and touch-based interaction.

In essence, multimedia now "personalizes" the information revolution.

There is general agreement among researchers that people have short-term retention of about 20 percent of what they hear, 40 percent of what they see and hear, and 75 percent of what they see, hear and do. For communication to be more effective, it must engage multisensory modes of learning and draw upon the full power of our experience of life.

Multimedia now combines the audio-visual power of television with the interactive power of computers to create a thoroughly intuitive, multidimensional vehicle of communication.

On a practical level, multimedia opens up the power of computers to millions of non-users, while accelerating the productivity of existing users. Multimedia can thoroughly transform many of the ways in which we transfer information – from training to education to merchandising to business presentations.

Evolution of multimedia

Multimedia finds its roots in the merging of television and computer technologies. For centuries, the only way to learn about events halfway around the globe was by reading the newspaper. But with television, suddenly those events occurred right in the living room.

While television revolutionized our access to information, the computer has revolutionized our ability to store and retrieve information.

Due to the differences between these technologies, these two revolutions have remained surprisingly independent of one another. Television is based on analog information – continuous and infinitely smooth gradations in value. Computers, of course, communicate digitally – assigning discrete numerical values to all information. The two approaches are inherently incompatible.

Bridging the gap between the worlds of analog video and digital computing has long depended on a hybrid approach based on the analog videodisk, which allows swift random access to analog video and audio information.

By combining the random-access capability of videodisks with "branching logic" programmed on computers, an entirely new information paradigm was created in the 1980s. Information content was broken down into discrete segments with "hyperpaths" linking related information. The idea was to make information responsive to the user – to allow the user to drive the presentation of information. Paired with the audiovisual power also afforded by videodisks, branching logic created the powerful concept of multimedia.

The analog problem

While videodisk-enabled multimedia provides extraordinary information power, it does have its limitations. These limitations boil down to the fact that two profoundly divergent technologies – analog video and digital computing – are being asked to create a unified solution.

Today, the majority of computers in America are connected by digital networks. Networks consolidate resources by allowing users shared access to information stored on servers. Networks also enable the rapid exchange of documents and information between locations.

But when multimedia content relies on analog media, the advantages of networking are lost. As every multimedia user is required to maintain a local videodisk player complete with a supply of videodisk applications, the costs of implementing multimedia on a large scale can be significant. Moreover, exchanging even snippets of multimedia information becomes problematical. Pressed onto videodisks by professional facilities, multimedia video content cannot be selectively excerpted by an end user and passed to colleagues as a computer file.

Just as important, as long as multimedia requires videodisk pressing, its use has been restricted to applications where the cost of videodisk pressing is justified. With videodisks, one cannot casually create a motion video "document" in the way that one casually creates word processing and spreadsheet files. Similarly, videodisk multimedia is ill suited to applications whose content needs to be augmented on regular occasions.

DVI: The digital revolution

Multimedia pioneers have long recognized the theoretical advantages of all-digital multimedia. The problem is that uncompressed digitized multimedia content overwhelms the storage and display capabilities of today's computers.

Storing complex analog information with any degree of fidelity required a large quantity of storage. Digitizing a mere 30 seconds of video, for example, requires over 600 megabytes of digital information – more than most computer hard drives can store.

Attempting to solve the storage problem, IBM and Intel Corp. have engaged in a partnership to develop a revolutionary new compression and decompression technology called Digital Video Interactive (DVI). At its root, DVI is based on technological sleight-of-hand.

Here's how it works. In order to be practical for networking and storage, digitized multimedia content must be compressed by a factor of at least 100 to one. Much of this compression can be achieved by selectively "throwing out" redundant bits of information. Additional compression can be achieved by storing only one out of every few bits; during compression, the missing pixels are interpolated through averaging of the known bits. Finally, as frame-by-frame passages of motion video segments contain similar video information, DVI compression algorithms can be set to store only new information for each frame, with redundant information retained from the previous frame.

Fine tuning such compression algorithms has taken years of development. Today, DVI is the result of work dating back to the early 1980s. Early implementations have been released to developers in sample quantities over the last year or two; now with IBM PS/2 ActionMedia II, DVI is for the first time made available to the general marketplace.

IBM PS/2 ActionMedia II provides a unified, all-digital multimedia environment allowing both display and capture of high-quality motion video, audio and still images in a single-slot implementation. IBM ActionMedia II forms a superior multimedia solution that can be used to augment PS/2s with multimedia capability and to network multimedia applications across entire organizations.

On a personal level, the IBM ActionMedia II platform converts PS/2s into dynamic "information theaters," revolutionizing communication and creating a sense of realism and excitement for a wide range of user applications.

The IBM PS/2 ActionMedia II solution

Software support

IBM PS/2 ActionMedia II will be supported initially by IBM OS/2. It is IBM's stated direction to provide compatibility with the Microsoft Windows 3.0 environment in the near future.

IBM PS/2 ActionMedia II comes complete with a powerful programming interface called the Audio Video Kernel (AVK). AVK is designed to provide a stable interface for application development well into the future.

The optional ActionMedia Developer's Toolkit allows application and tools developers to become more productive in the creation of ActionMedia II programs. Version 1.0 provides sample "C" source code for use with the AVK programming interface when running under OS/2, together with some AVSS (Audio/Video Support System) file utilities.

Two familiar IBM authoring and playback tools will provide special support for ActionMedia II. It is IBM's stated direction to support special versions of its DOS-based LinkWay™ authoring tool. In addition, IBM's powerful Audio Visual Connection™ (AVC) will provide ActionMedia playback of AVC applications in an all-digital environment, with the provision that content must be digitized before playback.

A number of independent software vendors are expected to provide additional authoring tool support. Springfield, Va.-based Network Technology Corp., for example, is expected to provide early support with a powerful "point-and-click" graphical authoring tool called "MEDIAscript™ OS/2-Desktop Edition," which will run under OS/2 Presentation Manager™ 1.3 and above.

It is IBM's stated direction also to support IBM Multimedia Windows Extensions 1.0 (MME) for Windows 3.0 and MME for OS/2. This support will include a Media Control Interface (MCI) driver that allows MME

applications to access the IBM ActionMedia II as a digital video device, for replay and capture of motion video files compressed in DVI formats.

Affordable, rewritable media

With IBM PS/2 ActionMedia II, multimedia content can for the first time be stored in a highly portable and affordable format. Digital CD-ROM optical disks, for example, can store up to 72 minutes of VCR quality motion video using PLV compression. In contrast to 12" videodisks, 5.25" CD-ROMs provide a far more inexpensive and convenient means of storage. In addition, the CD-ROM player itself can be housed in many PS/2 systems, saving desk space.

While typical analog multimedia technology is incapable of realtime production of videodisks, ActionMedia II applications can be created and stored directly on digital storage media. Possible media include everyday hard drives – on local PS/2s or servers – and newer rewritable optical disk media.

Rewritable optical disk technology provides the additional advantage of data portability. The IBM PS/2 3.5" Rewritable Optical Drive, for example, writes to a 127MB optical cartridge that resembles a floppy disk. Complete interactive multimedia applications can now be created, edited and distributed with astonishing convenience.

Using rewritable optical media, sales reps will be able to dazzle their clients with custom multimedia presentations portable in a shirt pocket. In education, teachers will use IBM PS/2 ActionMedia II-based LinkWay to create custom courseware complete with video and tailored to the needs of their own classes. In addition, these teachers will be able to access a new library of PLV quality CD-ROM educational titles that will provide an unmatched combination of quality, affordability and portability.

In the future, Write-Once CD-ROM devices will allow affordable in-house production of CD-ROMs, which ordinarily require pressing by an outside vendor. These devices will bring down the cost point of application production even further, while allowing compatibility with today's low-cost CD-ROM players.

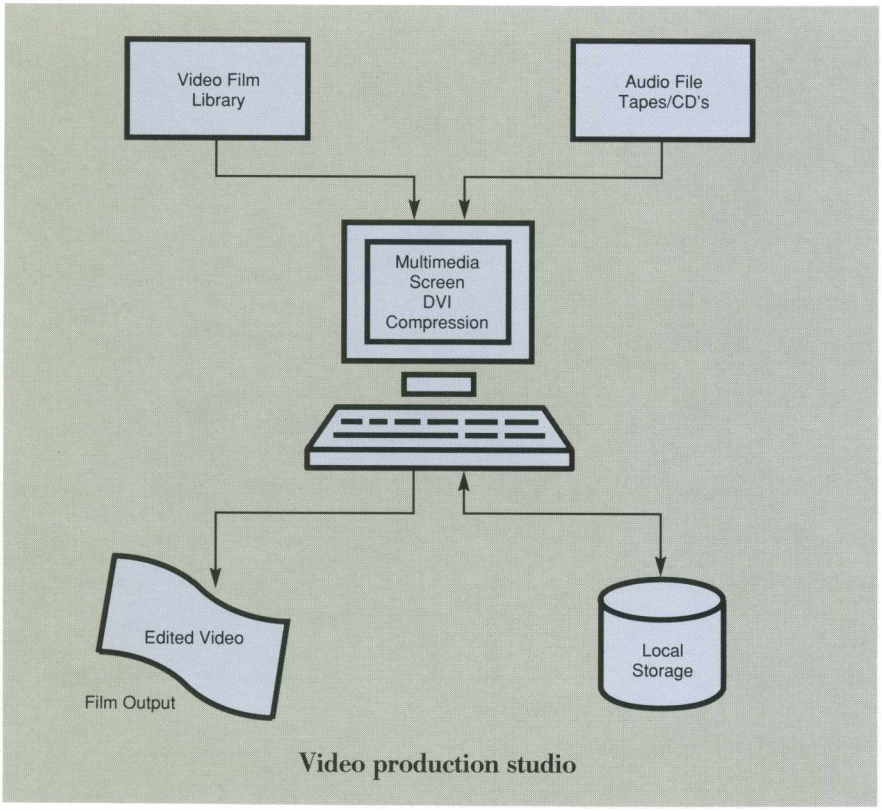
Networking of applications

Whichever digital media is chosen, application content will now be able to be stored on network servers for shared use by many individuals. Such storage saves redundant investment in both players and media and provides an excellent means of delivering just-in-time training and guidance, as well as internal corporate communications.

Networks will also allow the remote updating of multimedia content on local rewritable optical devices. Suppose, for example, that a major national corporation stored a multimedia "product catalog" on rewritable optical media across hundreds of field sales offices; using wide area networks, that corporation could now add and delete products from that catalog even on a daily basis.

PRESS ON A SECTION TO EXPLORE MORE ABOUT
RETURN TO MAIN MENU
HISTORY
HELP
NATIVE AMERICAN
FRENCH
ANGLO AMERICAN
CONNECTIONS TO VERMONT
GLOSSARY/INDEX

Real-world ActionMedia II applications



Video production studio

When supported by fast digital networks, ActionMedia II will also allow desk-to-desk videoconferencing. Such conferencing will provide face-to-face interaction between individuals in remote offices, with simultaneous display of documents or photographic images. Colleagues will even be provided "chalkboard" capability for screen annotation and highlighting of information.

Training: With ActionMedia II, lecture and text training formats will be replaced by dynamic, personalized multimedia training that engages each employee's full attention. Such multimedia training will provide not only vivid immediacy, but also the ability to customize itself to the needs of an individual. Pop quizzes, for example, can assess trainee knowledge and steer instruction to areas of weakness. And in the industrial workplace, simulation-based training can help equipment operators learn their jobs without risk to themselves or to expensive equipment. Wherever the training application, ActionMedia will take advantage of digital networking to deliver the content to many employees in a cost-effective manner.

Just-in-time guidance: Closely related to training is "just-in-time" guidance – a field traditionally served by reference manuals. Employees and workers are often called upon to perform tasks for which they need additional information or refresher training. This training could be delivered by analog multimedia technology, but would require videodisk players and a stock of videodisks at every location. With ActionMedia II, such instruction can be delivered in full-motion video by accessing a database of short vignettes over a local area network. Delivery of this information can be made very effective by making it sensitive to context and specific to the worker's skill. In addition, ActionMedia II allows new vignettes to be added or old ones updated with ease – modifications that are impractical using videodisk technology.

Education: ActionMedia II multimedia courseware will provide individualized instruction while replacing lecture and textual formats with a more interesting, engaging multisensory approach to learning. Such multimedia applications will not only provide vivid immediacy through training on demand but allow students to become explorers on a self-directed journey to discovery. Every step of the way, Action Media II will support that journey with the most expressive media embracing all forms from still images to full motion video, from text to audio. By storing educational content on servers, schools will use affordable networking to serve the needs of many students simultaneously.

Business desktop: In corporations, ActionMedia II will transform the business desktop into a platform for media-rich information navigation. Videoconferencing will allow colleagues to speak face to face from remote offices, share documents and spreadsheets on-screen, and interact with those documents through "chalkboard" capability. Meanwhile, business presentations will make a quantum leap in effectiveness by bringing such Hollywood-style sizzle as voiceovers, music and stunning visualization to the hands of end users.

Kiosk information and merchandising: Both business and government will find that public information exchange can be handled far more engagingly with walk-up multimedia kiosks based on IBM PS/2 ActionMedia II. These systems extend the familiar concept of the ATM machine to "interactive television" by providing such friendly enhancements as touch screens, motion video and stereo audio.

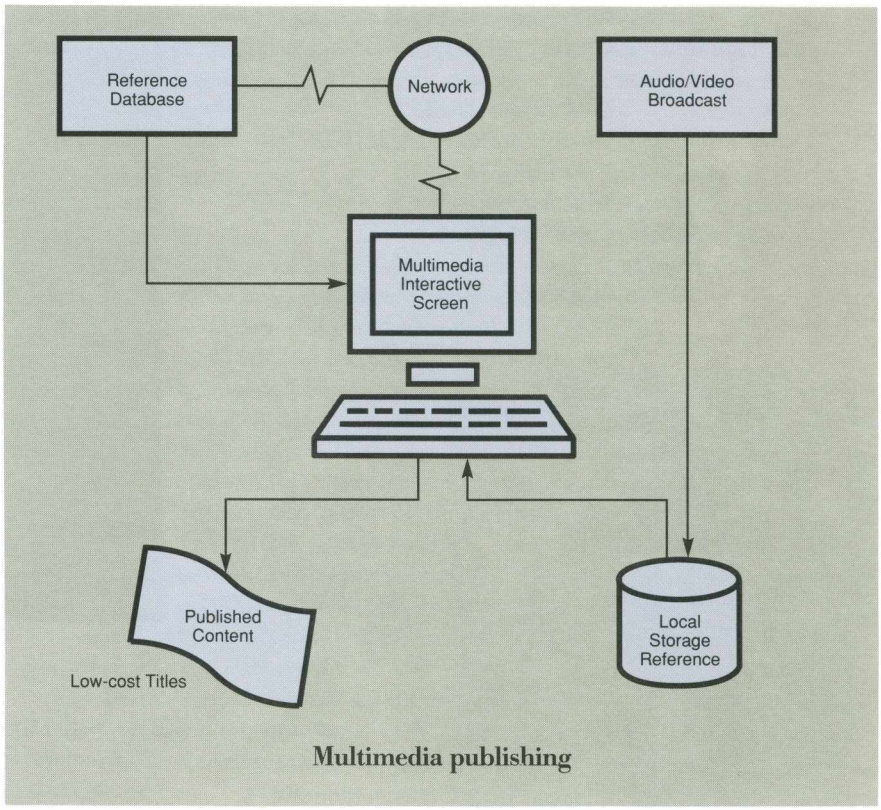
Point-of-information applications include destination locators in corporate lobbies, consumer education kiosks in stores, and government information kiosks.

Merchandising applications typically provide video presentations of product lines, with touch-screen navigation by customers. The result is a custom commercial that delivers persuasive, authoritative information at the most crucial possible moment – when the customer is ready to buy.

Video editing: While ActionMedia II provides a superior platform for creating interactive, non-linear multimedia applications, it will also be used to create and edit straightforward linear videos. When combined with custom software from independent software vendors, ActionMedia II will provide the engine for a complete low-cost video editing system – complete with many features found in today's high-end professional systems. Such features include "non-linear editing," which allows swift access to component video segments and easy sequencing of these segments into an editable "master" sequence. Content may be accessed from libraries of video cassettes, videodisks, audio tapes and CDs, and then captured and edited using local digital storage. Final video output can be stored on videocassettes, portable optical disks, or on a network server.

Home video buffs will use the low-cost, easy-to-use ActionMedia II systems to edit custom home videos. Creators of interactive multimedia applications will use the systems to edit video segments before integration into their application. Finally, corporations will use the systems to assemble video presentations and training films, which can be stored on the corporate computer network.

Multimedia publishing: As ActionMedia II is based on a stable programming interface, independent software vendors will create a market for prepackaged ActionMedia II interactive multimedia applications for the office, classroom and home. Such applications may be more affordable than today's videodisk applications, both because the media cost of CD-ROMs is lower, and also because customers will be able to spread the purchase cost over many users by placing the application on a network server.



Multimedia publishing

These are just a few of the many applications which can be developed on IBM ActionMedia II technology. The key to multimedia innovation is to imagine the possibilities – to sweep away the "fog" of outdated assumptions and examine your organization's need for information exchange against the blue sky of all-digital multimedia technology. Many companies have already done so; thanks to leading-edge multimedia implementations, they're already gaining a competitive edge in their industries.

Specifications

IBM ActionMedia II Display Adapter 2MB

IBM ActionMedia II Display Adapter/A 2MB

IBM ActionMedia II Capture Option

Programming requirements
IBM OS/2 Version 1.3 is required for the installation of the Version 1.0 supplied Audio Video Kernel Version (AVK) device drivers.

Machine requirements
The ActionMedia II Display Adapter 2MB can be installed in Personal System/2 Models 35SX and 40SX. The ActionMedia II Display Adapter/A 2MB can be installed in PS/2 Models 55SX, 57SX, M57 SLC, 65, 70, 73, 80, 90, and 95. When the ActionMedia II Display Adapter/A 2MB is used with the AVK programming interface, a minimum of 4MB of system memory is required, but 6MB is recommended.

The ActionMedia II Capture Option is a daughter card that attaches to either ActionMedia II Display Adapter on any supported PS/2.

Limitations
The ActionMedia II Display Adapter/A 2MB is required to be installed either in a 16 bit expansion slot, or in a 32 bit expansion slot without Matched Memory Extension, of any supported Personal System/2® computer.

When configuring a Personal System/2 with ActionMedia II, it may be necessary to limit the utilization of system expansion slots to avoid the possibility of overloading the 12 volt power supplies. If ActionMedia II is being installed with the Capture Option, then it is necessary to have a minimum of:

1. Either one empty expansion slot, or
2. One expansion slot occupied by an option card not requiring +12 and/or -12 volt power. As a guide, it may be assumed that option cards providing networking or communications support are likely to require 12 volt power.

Compatibility
The ActionMedia II Display Adapter/A 2MB cannot be used in conjunction with the following Personal System/2 options:

- The 8514/A Display Adapter
- The PS/2 M-Motion™ Video Adapter/A
- The PS/2 Image Adapter/A*

* Except in those systems (such as the IBM PS/2 Ultimedia Model M57 SLC) that have multiple 16-bit expansion slots or multiple 32-bit expansion slots without matched memory extension.

Connectors
Both ActionMedia II Display Adapters have the following external interfaces:

1. Host system bus (ISA or MCA).
2. Analog RGB video output and sync to a VGA or XGA color monitor.
3. Two channels of audio output to audio amplifiers and speakers.
4. Auxiliary Video Extension (AVE) input, for receipt of the host system's VGA output on PS/2s that support AVE.
5. RGB video input connector from the host system's graphics adapter output.
6. Capture bus for connection between the display adapter and the daughter card.
7. Analog (S-VHS) auxiliary video output, suitable for use by such standard video devices as VCRs and TVs. N.B. This video output carries only DVI-generated video; host system graphics output is not available.

The ActionMedia II Display Adapter 2MB also has a SCSI connector and includes cable for attaching a PS/2 Internal SCSI CD-ROM Drive. The SCSI connector may be used only to provide CD-ROM data to a DVI application running on that ActionMedia II adapter. The compatible drive cannot be fitted in a Personal System/2 Model 35SX.

Supported graphics adapter and monitor cabling configurations
- A PS/2 color monitor connected to both the ActionMedia II display adapter and the host VGA system, using the ActionMedia II Video Cable.
- A PS/2 color monitor connected to both the ActionMedia II display adapter and the host XGA system or an XGA graphics adapter, using the ActionMedia II Video Cable.
- A PS/2 color monitor connected directly to an ActionMedia II display adapter and a second PS/2 monitor connected directly to the host VGA or XGA output connector.

Physical specifications
- ActionMedia II Display Adapter 2MB with or without Capture Option:
  - Length: 340mm (13.4 inches)
  - Height: 107mm (4.2 inches)
- ActionMedia II Display Adapter/A 2MB with or without Capture Option:
  - Length: 305mm (12.0 inches)
  - Height: 89mm (3.5 inches)
- ActionMedia II Capture Option:
  - Length: 200mm (7.9 inches)
  - Height: 80mm (3.2 inches)

Operating environment
The ActionMedia II features will operate in the same environment as the Personal System/2 computer in which they are installed, and meet the following certification requirements: FCC - Class A (Class B applied for) VDE Class B EN55022.

Developer support
The ActionMedia II Developer's Toolkit allows application and tools developers to become more productive in the creation of ActionMedia II programs. Version 1.0 provides sample 'C' source code for use with the ActionMedia II Audio Video Kernel (AVK) programming interface when running under OS/2, together with some AVSS (Audio/Video Support System) file utilities. The Developer's Toolkit also includes the ActionMedia II Technical Reference Manual and a Programmer's Guide.

The ActionMedia II Technical Reference Manual is also available separately.

Supplemental fact sheet
A supplemental fact sheet on the IBM ActionMedia II platform describes options for video image resolutions, color support and compression algorithms.

The future: how to get there

If you'd like to join this exciting new world of digital multimedia, you're not alone. Major corporations are starting to standardize on ActionMedia technology, securing competitive advantages that can last for years. Digital multimedia is the future, and the future is made available now with the IBM PS/2 ActionMedia II.

For additional information, contact your local IBM representative, your IBM Authorized Remarketer who specializes in multimedia products, or call 1-800-426-9402.

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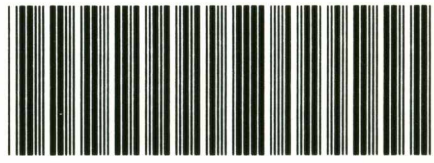

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